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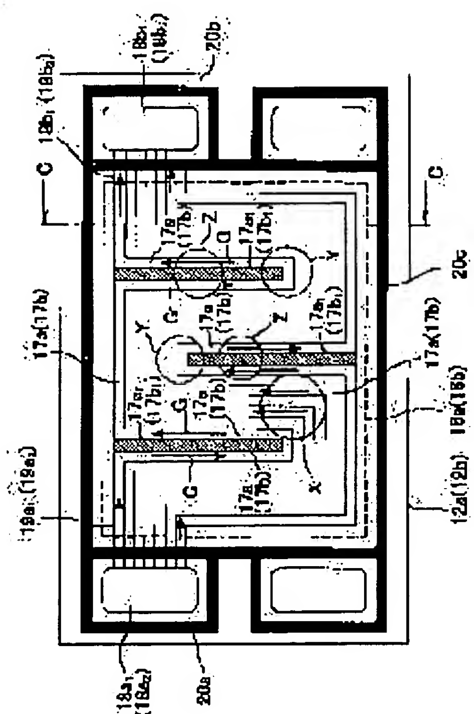
(54) SOLID POLYMER FUEL CELL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a solid polymer fuel cell always keeping stable cell performance by reducing pressure difference between reaction gases flowing in a state of facing zigzag passages of a separator.

SOLUTION: This solid polymer fuel cell has partition walls 17a1, 17b1 partitioning passages 17a, 17b through which reaction gas zigzag flows in the middle points of separators 12a, 12b, and has a means (carbon fibers arranged in parallel to the reaction gas flowing direction) preventing penetration and flow of the reaction gas from one passage to the adjacent passage in each region of a fuel electrode 16a and an oxidizing agent electrode 16b coming in contact with the partition walls 17a1, 17b1 partitioning the passages 17a, 17b through which the reaction gas flows in a state of facing.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] this invention is boiling a polymer electrolyte fuel cell, and relates to the polymer electrolyte fuel cell which adds amelioration to the path of reactant gas and makes flow of reactant gas good especially.
[0002]
[Description of the Prior Art] Since the fuel cell using the solid-state polyelectrolyte film equipped with proton conductivity as an electrolyte can use a configuration as a compact, and electric generating power is high power density, and it makes a system simplify and operation of it is possible, it attracts attention as power sources the object for space, for cars, etc. besides the distributed power source for stationing.
[0003] Although many are developed and it is commercialized as this polyelectrolyte film, recently, many perfluorocarbon-sulfonic-acid film (for example, Nafion: a trade name, Du Pont make) is used.
[0004] The polymer electrolyte fuel cell using such polyelectrolyte film While arranging the porous fuel electrode and porous oxidizer pole which cover the catalyst of platinum etc. on both sides of the polyelectrolyte film, form a catalyst bed, and are further excellent in gaseous diffusion nature toward an outside from a catalyst bed A separator with the concave slot which supplies fuel gas or oxidant gas to the outside of each pole is arranged, it considers as a cell (single cel), a cooling plate etc. can be inserted into this cell, and it forms as a layer.
[0005] An example of the conventional cell is shown in drawing 15 .
[0006] A cell 1 is arranged on both the outsides of the solid-state polyelectrolyte film 2 with the ion conductivity arranged in the center section, and this solid-state polyelectrolyte film 2, and has become the membrane electrode complex 5 equipped with porous fuel electrode 4a and oxidizer pole 4b which were made to infix the catalyst beds 3a and 3b of the shape of a sheet created with platinum etc., and were excellent in gaseous diffusion nature. Here, what summarized the solid-state polyelectrolyte film 2, catalyst beds 3a and 3b, fuel electrode 4a, and oxidizer pole 4b to one is said in the membrane electrode complex 5. In addition, mutually, extend for a long time than each two poles 4a and 4b, and the reactant gas which supplies the solid-state polyelectrolyte film 2 to fuel electrode 4a and oxidizer film 4b made it jump out, and provides the sealant (not shown) in this part that jumps out so that it may not interfere and collide.
[0007] Moreover, the cell 1 is equipped with the separators 6a and 6b which take out the current arranged on both the outsides of the membrane electrode complex 5. Separators 6a and 6b are equipped with the reactant gas feed hopper eight a1 which carries out the feeding and discarding of the reactant gas to a both-ends side, eight a2, and the reactant gas exhaust port eight b1 and eight b2 while they form the paths 7a and 7b of a bridge wall seven a1 and the concave slot divided by seven b1 in the interstitial segment of the side which contacts each of fuel electrode 4a and oxidizer pole 4b. In addition, the reactant gas supplied to the reactant gas feed hopper eight a1 of Separators 6a and 6b and each of eight a2 flows moving in a zigzag direction from the communication way nine a1 and nine a2 to the solid-state polyelectrolyte film 2, and is discharged by the reactant gas exhaust port eight b1 and each of eight b2 from the communication way nine b1 and each of nine b2. Moreover, Separators 6a and 6b form sealants 10a and 10b in the reactant gas feed hopper eight a1, eight a2 and the reactant gas exhaust port eight b1, and each of eight b2, and are raising the seal nature of gas.
[0008] On the other hand, a bridge wall seven a1 and the paths 7a and 7b which carry out partition formation by seven b1 to the interstitial segment of Separators 6a and 6b As shown in drawing 16 , while connecting with the reactant gas feed hopper eight a1, eight a2 and the reactant gas exhaust port eight b1, and each of eight b2 through the communication way nine a1, nine a2, nine b1, and nine b2 The pars intermedia is formed in the shape of meandering, the gas and the parallel flow which flow the next path in a location X are made to carry out, or the flowing reactant gas and counterflow are made to carry out the next path bordering on the clinch

location Y in a location Z, and flow of gas is made good.
[0009] Moreover, Separators 6a and 6b have prevented exsorption out of the vessel of each gas while they form sealants 10a, 10b, and 10c in each outside of the reactant gas feed hopper eight a1, eight a2, the reactant gas exhaust port eight b1, eight b2, and Paths 7a and 7b and prevent a collision and interference of fuel gas and oxidant gas. In addition, a broken line shows fuel electrode 4a or oxidizer pole 4b.
[0010] Thus, it was diffused more widely and was raising generating of the electrical and electric equipment in the case of the electrochemical reaction of reactant gas while the conventional polymer electrolyte fuel cell adds a device to the paths 7a and 7b of the concave slot formed in the pars intermedia of Separators 6a and 6b, makes the water generated in case each of the reactant gas by the side of a fuel electrode and the reactant gas by the side of an oxidizer pole reacts on each pole flow out out of a vessel early more and maintained the rate of flow of reactant gas highly.
[0011]
[Problem(s) to be Solved by the Invention] The conventional polymer electrolyte fuel cell shown in drawing 15 and drawing 16 The paths 7a and 7b of the separators 6a and 6b which touch each of a fuel electrode and an oxidizer pole are formed in the shape of meandering. Although the water which adopts a parallel flow or counterflow in plenty between the gas which flows the next path, and is generated in the case of the reaction of reactant gas is made to flow out out of a vessel early more It was difficult to always maintain the pressure (static pressure) of reactant gas highly, and the trouble which should be improved for this reason was included.
[0012] It turned out that pressure loss becomes [reactant gas] high along with the other side at an outlet side from an entrance side, and a pressure (static pressure) falls to the pars intermedia of Separators 6a and 6b at the paths 7a and 7b of a bridge wall seven a1 and the letter of meandering which carries out partition formation by seven b1. That is, in the location X shown in drawing 16 , although it had become a parallel flow between the reactant gas which flows the next path, since the distance from an entrance side differed with some when it observes and analyzes minutely, it turned out that differential pressure has produced two paths between the flowing reactant gas. Owing to, this differential pressure might penetrate reactant gas to the next path through the cross section of a porous pole.
[0013] Moreover, in the location Z shown in drawing 16 , although it had become counterflow between the reactant gas which flows the next path, between the flowing reactant gas, still bigger differential pressure than an above-mentioned parallel flow has come out, and two paths were understood also for the amount penetrated to the next path through the cross section of a porous pole being larger. For this reason, it turned out that the flow rate of the reactant gas which flows the clinch location Y shown in drawing 16 falls remarkably compared with an average reactant gas flow rate.
[0014] Thus, if a bias cannot arise in current density, or cannot maintain hydrogen potential by the lack of a fuel highly when reactant gas is fuel gas if a part with little amount of supply of reactant gas comes out locally in path 7a of Separators 6a and 6b, and 7b, but big polarization occurs, and it becomes the factor which reduces an electrical potential difference and polarization becomes remarkably large, it is the factor which makes corrosion cause a catalyst bed.
[0015] This invention was made based on such a situation, and aims at offering the polymer electrolyte fuel cell which can maintain the cell engine performance which lessened differential pressure of the reactant gas which flows between the paths of the letter of meandering of a separator, and was always stabilized.
[0016]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the polymer electrolyte fuel cell concerning this invention The solid-state polyelectrolyte film which puts a catalyst bed on both sides as indicated to claim 1, In a polymer electrolyte fuel cell equipped with the separator arranged on each outside of the fuel electrode and oxidizer pole which are arranged on both the outsides of this solid-state polyelectrolyte film, and a these fuel electrodes and an oxidizer pole It has the bridge wall which divides the path which passes reactant gas in the shape of meandering in the middle of said separator. It has a means to prevent that said reactant gas penetrates and flows from one path at the next path into each field part of said fuel electrode which contacts the bridge wall which divides the path where said reactant gas serves as counterflow, and said oxidizer pole.
[0017] Moreover, a means to prevent that reactant gas penetrates to the next path and the polymer electrolyte fuel cell concerning this invention flows from one path to it as indicated to claim 2 in order to attain the above-mentioned purpose is characterized by being the carbon fiber with which a fuel electrode and an oxidizer pole are filled up.
[0018] Moreover, in order that the polymer electrolyte fuel cell concerning this invention may attain the above-mentioned purpose, as indicated to claim 3, a carbon fiber is arranged in parallel in accordance with the flow of reactant gas.

[0019] Moreover, the polymer electrolyte fuel cell concerning this invention The solid-state polyelectrolyte film which puts a catalyst bed on both sides as indicated to claim 4 in order to attain the above-mentioned purpose, In a polymer electrolyte fuel cell equipped with the separator arranged on each outside of the fuel electrode and oxidizer pole which are arranged on both the outsides of this solid-state polyelectrolyte film, and a these fuel electrodes and an oxidizer pole It has the bridge wall which divides the path which passes reactant gas in the shape of meandering in the middle of said separator. The densification field which prevents that said reactant gas penetrates and flows from one path at the next path into each field part of said fuel electrode which contacts the bridge wall which divides the path where said reactant gas serves as counterflow, and said oxidizer pole is formed.
[0020] Moreover, in order that the polymer electrolyte fuel cell concerning this invention might attain the above-mentioned purpose, as it indicated to claim 5, among liquid rubber, resin, and carbon, the densification field which prevents reactant gas penetrating to the next path and flowing to it from one path chooses either, is infiltrated, and is formed.
[0021] Moreover, in order that the polymer electrolyte fuel cell concerning this invention may attain the above-mentioned purpose, as indicated to claim 6, resin is characterized by being polyvinylidene fluoride.
[0022] Moreover, in order that the polymer electrolyte fuel cell concerning this invention may attain the above-mentioned purpose, as indicated to claim 7, carbon is characterized by carbon powder and a surfactant being principal components.
[0023] Moreover, the polymer electrolyte fuel cell concerning this invention The solid-state polyelectrolyte film which puts a catalyst bed on both sides as indicated to claim 8 in order to attain the above-mentioned purpose, In a polymer electrolyte fuel cell equipped with the separator arranged on each outside of the fuel electrode and oxidizer pole which are arranged on both the outsides of this solid-state polyelectrolyte film, and a these fuel electrodes and an oxidizer pole The bridge wall which divides the path where said reactant gas serves as counterflow among the bridge walls which divide the path which passes reactant gas in the shape of meandering is formed in the middle of said separator more highly than the height of the bridge wall which divides other paths.
[0024] Moreover, the polymer electrolyte fuel cell concerning this invention The solid-state polyelectrolyte film which puts a catalyst bed on both sides as indicated to claim 9 in order to attain the above-mentioned purpose, In a polymer electrolyte fuel cell equipped with the separator arranged on each outside of the fuel electrode and oxidizer pole which are arranged on both the outsides of this solid-state polyelectrolyte film, and a these fuel electrodes and an oxidizer pole It has the bridge wall which divides the path which passes reactant gas in the shape of meandering in the middle of said separator. Reactant gas the non-penetrated field which prevents that said reactant gas penetrates and flows from one path at the next path into each field part of said fuel electrode which contacts the bridge wall which divides the path where said reactant gas serves as counterflow, and said oxidizer pole is formed.
[0025] Moreover, reactant gas the non-penetrated field which prevents that reactant gas penetrates to the next path and the polymer electrolyte fuel cell concerning this invention flows from one path to it as indicated to claim 10 in order to attain the above-mentioned purpose is characterized by being the sheet section which uses either as a principal component among liquid rubber and resin.
[0026] Moreover, in order that the polymer electrolyte fuel cell concerning this invention may attain the above-mentioned purpose, as indicated to claim 11, fabrication of the sheet section is carried out to horseshoe-shaped.
[0027] Moreover, the sheet section which carries out fabrication to horseshoe-shaped is inserted in the infeed slot fabricated to each of a fuel electrode and an oxidizer pole, and the pressure welding of it is carried out and it is made to put with a press, as it indicated to claim 12, in order that the polymer electrolyte fuel cell concerning this invention might attain the above-mentioned purpose.
[0028]
[Embodiment of the Invention] The sign which gave the operation gestalt of the polymer electrolyte fuel cell concerning this invention to the drawing and the drawing hereafter is quoted and explained.
[0029] Drawing 1 is the conceptual diagram showing the 1st operation gestalt of the polymer electrolyte fuel cell concerning this invention.
[0030] The polymer electrolyte fuel cell concerning this operation gestalt arranges the membrane electrode complex 11 in the center, arranges Separators 12a and 12b on both the outsides of the membrane electrode complex 11, constitutes a cell 13, and it uses a cell 13 also for how many at the shape of a layer, using it as the electric aggregate (electric stack) in piles.
[0031] The membrane electrode complex 11 is equipped with oxidizer pole 16b which arranges fuel electrode 16a arranged on one outside among the solid-state polyelectrolyte film 14 arranged in the center, the catalyst beds 15a and 15b put on the both sides of the solid-state polyelectrolyte film 14, and these catalyst beds 15a and

15b on the outside of another side.
[0032] The solid-state polyelectrolyte film 14 is several 10 microns in thickness of super-** type, and perfluorocarbon sulfonic acid etc. is used. Moreover, the catalyst beds 15a and 15b put on the both sides of the solid-state polyelectrolyte film 14 are what added acetylene black to the platinized platinum catalyst, and the thickness has also become 100 microns from several 10 microns.
[0033] Moreover, the solid-state polyelectrolyte film 14 which puts catalyst beds 15a and 15b on both sides arranges porous fuel electrode 16a and oxidizer pole 16b which are excellent in gaseous diffusion nature among Separators 12a and 12b. That the solid-state polyelectrolyte film 14 is making each of fuel electrode 16a and oxidizer pole 16b infix among Separators 12a and 12b Separators 12a and 12b are equipped with the paths 17a and 17b of the shape of a concave for reactant gas supply from the first, and since planar pressure does not join the film which hits the paths 17a and 17b of the shape of this concave, it is for preventing decline in the rate of electrical transmission in an interface.
[0034] Moreover, the separators 12a and 12b arranged on both the outsides of the membrane electrode complex 11 are equipped with the reactant gas feed hopper 18a1 which carries out the feeding and discarding of the reactant gas to a both-ends side, 18a2 and the reactant gas exhaust port 18b1, and 18b2 while they form the paths 17a and 17b of a bridge wall 17a1 and the concave slot divided by 17b1 in the interstitial segment of the side which touches each of fuel electrode 16a and oxidizer pole 16b.
[0035] In addition, the reactant gas supplied to the reactant gas feed hopper 18a1 of Separators 12a and 12b and each of 18a2 flows moving in a zigzag direction from the communication way 19a1 and 19a2 to the solid-state polyelectrolyte film 14, and is discharged by the reactant gas exhaust port 18b1 and each of 18b2 from the communication way 19b1 and each of 19b2. Moreover, Separators 12a and 12b form sealants 20a and 20b in the reactant gas feed hopper 18a1, 18a2 and the reactant gas exhaust port 18b1, and each of 18b2, and are raising the seal nature of reactant gas.
[0036] On the other hand, a bridge wall 17a1 and the paths 17a and 17b which carry out partition formation by 17b1 to the interstitial segment of Separators 12a and 12b As shown in drawing 2 , while connecting with the reactant gas feed hopper 18a1, 18a2 and the reactant gas exhaust port 18b1, and each of 18b2 through the communication way 19a1, 19a2, 19b1, and 19b2, the paths 17a and 17b which carry out partition formation are formed in the pars intermedia in the shape of meandering. Moreover, Separators 12a and 12b form sealants 20a, 20b, and 20c in each outside of the reactant gas feed hopper 18a1, 18a2, the reactant gas exhaust port 18b1, 18b2, and Paths 17a and 17b, and are maintaining the seal nature of reactant gas highly.
[0037] The inside of the bridge wall 17a1 which forms pars intermedia in the shape of meandering, and the paths 17a and 17b which divide by 17b1, As each field part of fuel electrode 16a and oxidizer pole 16b which contact the bridge wall 17a1 which becomes flowing reactant gas G and counterflow, and the field part of 17b1 shows the next paths 17a and 17b to drawing 3 in a location Z bordering on the clinch location Y While producing with a carbon fiber CAR, adhesives, etc., the sense of a carbon fiber CAR is arranged in parallel in accordance with a bridge wall 17a1 and the shaft orientations (flow direction of the reactant gas which flows Paths 17a and 17b) of 17b1, as shown in drawing 4 .
[0038] Thus, this operation gestalt arranges a carbon fiber CAR in parallel along the flow direction of reactant gas G into the field part of fuel electrode 16a and oxidizer pole 16b which contact the bridge wall 17a1 which divides Paths 17a and 17b as a concave slot, and 17b1. Since the function to make the reactant gas which it is going to penetrate toward the opening and pore which are formed in the interior of fuel electrode 16a and oxidizer pole 16b prevent as a kind of barrier is given to the carbon fiber The flow of the reactant gas penetrated from one path to the next path through the opening and pore of fuel electrode 16a and oxidizer pole 16b can be prevented certainly.
[0039] Therefore, the inside of the paths 17a and 17b formed in the middle of Separators 12a and 12b with this operation gestalt, A carbon fiber CAR is arranged in parallel along the flow direction of reactant gas G into the field parts of fuel electrode 16a which contacts the paths 17a and 17b where reactant gas G becomes counterflow and flows, and oxidizer pole 16b. Since while has prevented the crossing flow (bypass flow) from a path to the next path based on the transparency to fuel electrode 16a of reactant gas G, and oxidizing agent pole 16b The cell engine performance which lessened differential pressure of the reactant gas which flows one path, and the reactant gas which flows the next path, and was always stabilized can be maintained.
[0040] Moreover, since this operation gestalt lessens differential pressure of the reactant gas in the location Z shown in drawing 2 with which while flows a path, and the reactant gas which flows the next path, flow also with the good reactant gas used as the parallel flow in a location X can be made to maintain it.
[0041] Drawing 5 is the flow rate gap ratio diagram of the reactant gas by which the gap ratio of the maximum stream flow of reactant gas and the minimum discharge which flow the path in the location where reactant gas serves as counterflow is shown on an axis of ordinate, and resistance (resistance of a carbon fiber to the

transparency of reactant gas based on arranging a carbon fiber in parallel in accordance with the flow of reactant gas) of a pressure is shown on an axis of abscissa.
[0042] In this drawing, the experimental result showed that the direction of the transparency style to which reactant gas flows to the next path through a path to one fuel electrode or oxidizer pole of this operation gestalt (this invention) had decreased remarkably compared with the former.
[0043] Drawing 6 and drawing 7 are the conceptual diagrams showing the 2nd operation gestalt of the polymer electrolyte fuel cell concerning this invention. In addition, drawing 6 is the top view of the separator seen through from the head [of a fuel electrode], or head side of an oxidizer pole, and drawing 7 is the top view of the fuel electrode which forms in a high density field the field part which contacts the bridge wall which carries out partition formation of the path where reactant gas serves as counterflow among the paths formed in the middle of the separator shown in drawing 6 in the shape of meandering, and an oxidizer pole. Moreover, the same sign is given to the same component as the component of the 1st operation gestalt.
[0044] The polymer electrolyte fuel cell concerning this operation gestalt forms in the densification field HDA without an opening and pore the field part of fuel electrode 16a and oxidizer pole 16b which contact the bridge wall 17a1 which carries out partition formation of the paths 17a and 17b in the location Z where reactant gas G in Separators 12a and 12b becomes counterflow, and 17b1.
[0045] This densification field HDA is attained by choosing either and infiltrating it into the field part of fuel electrode 16a and oxidizing agent pole 16b which contact the bridge wall 17a1 which carries out partition formation of the paths 17a and 17b of Separators 12a and 12b, and 17b1 among resin, liquid rubber, and carbon.

[0046] For example, what is necessary is in the case of resin, to form the sheet of polyvinylidene fluoride in a heat-resistant fluororesin and a concrete target in the shape of a strip of paper as an example, to be located in the field parts of above-mentioned fuel electrode 16a and oxidizer pole 16b, and just to process the polyvinylidene fluoride of the shape of this strip of paper with a hotpress. Whenever [stoving temperature] has 150 degrees C - proper 180 degrees C near the melting point of polyvinylidene fluoride.
[0047] Moreover, silicone rubber may be pressed fit in liquid rubber and a concrete target as an achievement means of the densification field HDA at the field parts of above-mentioned fuel electrode 16a and oxidizer pole 16b.
[0048] Furthermore, when using carbon powder, the field parts of above-mentioned fuel electrode 16a and oxidizing agent pole 16b may be made to dry after coating the suspension which uses carbon powder and a surfactant as a principal component, and a surfactant may be evaporated.
[0049] This operation gestalt Thus, the inside of resin, liquid rubber, and carbon, Since the field parts of the bridge wall 17a1 which chooses either and carries out partition formation of the paths 17a and 17b of Separators 12a and 12b, above-mentioned fuel electrode which contacts 17b1 16a, and oxidizer pole 16b are formed in a densification field without an opening and pore It can prevent penetrating from one path of reactant gas G to the path of another side through fuel electrode 16a and oxidizer pole 16b, the flow of reactant gas G can be stabilized, and the cell engine performance can be maintained highly.
[0050] In addition, since the humidification water supplied from the water generated during a generation of electrical energy or the outside changes a densification field into a wet seal condition when forming a high density mold field with carbon powder, in the counterflow of reactant gas, it is convenient at the point of preventing transparency of the reactant gas from one path to the path of another side.
[0051] Drawing 8 and drawing 9 are the conceptual diagrams showing the 3rd operation gestalt of the polymer electrolyte fuel cell concerning this invention. In addition, drawing 8 is the top view of the separator seen through from the head [of a fuel electrode], or head side of an oxidizer pole, and drawing 9 is a cutting sectional view cut [of drawing 8] from an E-E view. Moreover, the same sign is given to the same component as the component of the 1st operation gestalt.
[0052] The polymer electrolyte fuel cell concerning this operation gestalt forms more highly than other bridge walls 17a1 and 17b1 bridge wall 21ab which carries out partition formation of the paths 17a and 17b formed in the middle of Separators 12a and 12b in the shape of meandering, and 21b1.
[0053] Thus, among [the bridge wall 17a1 which carries out partition formation of the paths 17a and 17b which form this operation gestalt in the shape of meandering, among 17b1], If reactant gas G forms more highly than other bridge walls 17a1 and 17b1 the bridge wall 21a1 which carries out partition formation of the paths 17a and 17b which serve as counterflow in a location Z, and 21b1, as shown in drawing 9 and drawing 10 Since high thrust (contact pressure) is applied to the contact field CA of fuel electrode 16a and oxidizer pole 16b from a bridge wall 21a1 and 21b1, the contact field CA of fuel electrode 16a and oxidizer pole 16b is compressed, and densification of the presentation is carried out.
[0054] Therefore, among [the bridge wall 17a1 which carries out partition formation of the paths 17a and 17b

formed in the middle of Separators 12a and 12b with this operation gestalt, among 17b1], The bridge wall 21a1 which carries out partition formation of the paths 17a and 17b in the location Z where reactant gas G becomes counterflow, and 21b1 are formed more highly than other bridge walls 17a1 and 17b1. A bridge wall 21a1 and the high thrust from 21b1 are applied to the contact field CA of fuel electrode 16a and oxidizer pole 16b, and densification of the contact field CA is carried out. Based on the transparency to fuel electrode 16a of reactant gas G, and oxidizer pole 16b, since while has prevented the crossing flow from a path to the next path, the cell engine performance which lessened differential pressure of the reactant gas which flows one path, and the reactant gas which flows the next path, and was always stabilized can be maintained.

[0055] Drawing 11 and drawing 12 are the conceptual diagrams showing the 4th operation gestalt of the polymer electrolyte fuel cell concerning this invention. In addition, drawing 11 is the top view of the separator seen through from the head [of a fuel electrode], or head side of an oxidizer pole, and drawing 12 is the top view of the fuel electrode which forms in reactant gas a non-penetrated field the field part which contacts the bridge wall which carries out partition formation of the path where reactant gas serves as counterflow among the paths formed in the middle of the separator shown in drawing 11 in the shape of meandering, and an oxidizer pole. Moreover, the same sign is given to the same component as the component of the 1st operation gestalt.

[0056] The polymer electrolyte fuel cell concerning this operation gestalt forms in the reactant gas non-penetrated field GSOA the field part of fuel electrode 16a and oxidizer pole 16b which contact the bridge wall 17a1 which carries out partition formation of the paths 17a and 17b in the location Z where reactant gas G in Separators 12a and 12b becomes counterflow, and 17b1.

[0057] As the paths 17a and 17b of Separators 12a and 12b are shown in the field part of fuel electrode 16a and oxidizer pole 16b which contact the bridge wall 17a1 which carries out partition formation, and 17b1 at drawing 13 , this the reactant gas non-penetrated field GSOA The infeed slot (slit) 22 is formed, the sheet section 23 which carries out fabrication to horseshoe-shaped is inserted in the infeed slot (slit) 22, and as shown in drawing 14 , a hotpress is added and formed from a head [of the sheet section 23], and pars-basilaris-ossis-occipitalis side.

[0058] In addition, the sheet section 23 is produced by resin or liquid rubber, such as polyvinylidene fluoride.

[0059] Thus, the sheet section 23 is used for this operation gestalt. Since the field part of fuel electrode 16a and oxidizer pole 16b which contact the bridge wall 17a1 which carries out partition formation of the paths 17a and 17b of Separators 12a and 12b, and 17b1 is formed in the reactant gas non-penetrated field GSOA without an opening and pore It can prevent penetrating from one path of reactant gas G to the path of another side through fuel electrode 16a and oxidizer pole 16b, the flow of reactant gas G can be stabilized, and the cell engine performance can be maintained highly.

[0060]

[Effect of the Invention] The polymer electrolyte fuel cell concerning this invention as the above explanation Since it has a reactant gas transparency prevention means to prevent the flow of the reactant gas which penetrates the path of a separator into the field parts of the fuel electrode which contacts the bridge wall which carries out partition formation, and an oxidizer pole The crossing flow of the reactant gas with which while taking a counterflow format flows from a path to the path of another side through a fuel electrode and an oxidizer pole can be prevented, the pressure of the reactant gas which flows both the paths that take a counterflow format can be made almost the same, flow can be carried out in the style of stability, and the cell engine performance can be maintained highly.

[Translation done.]

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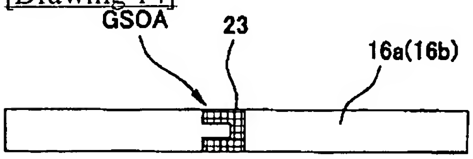
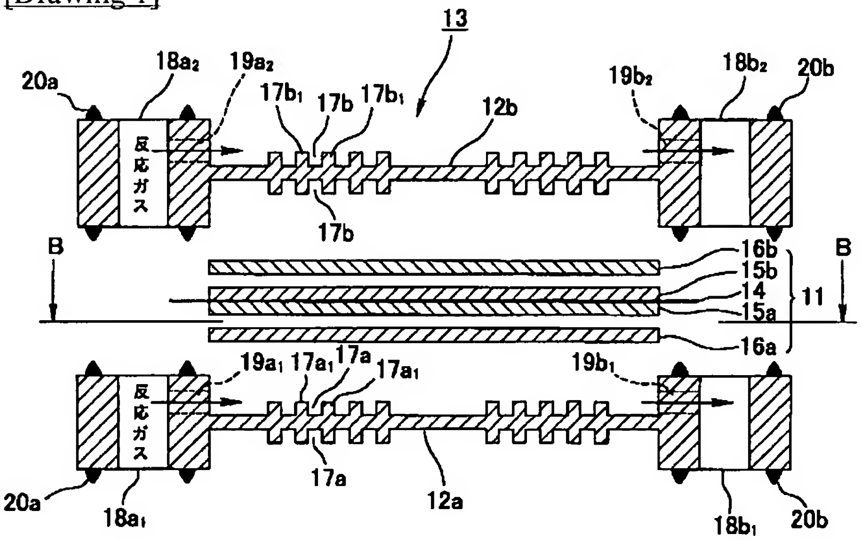
DRAWINGS

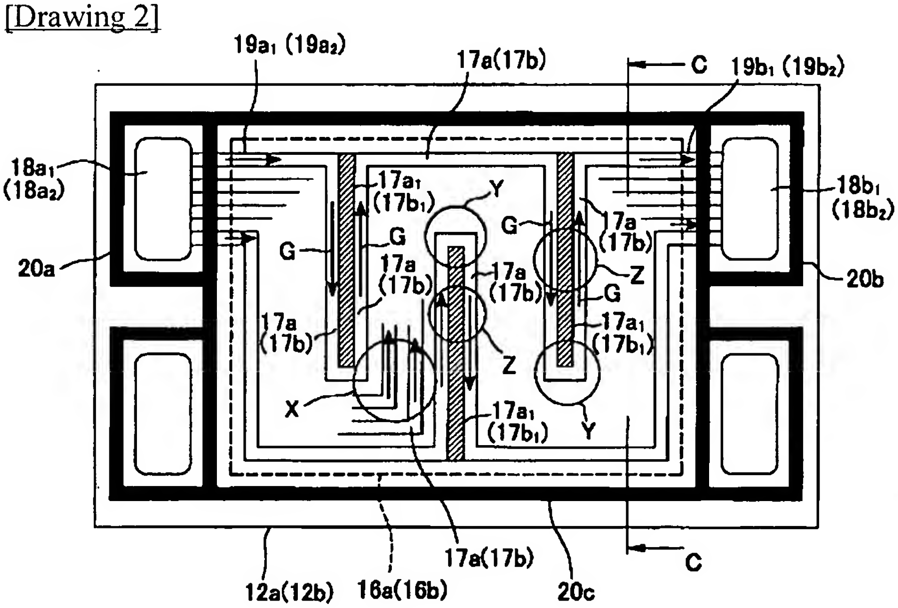
[Drawing 14]



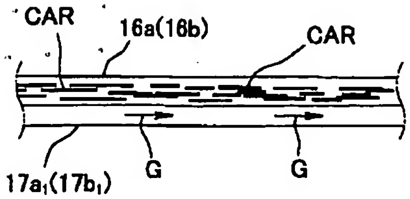
[Drawing 1]



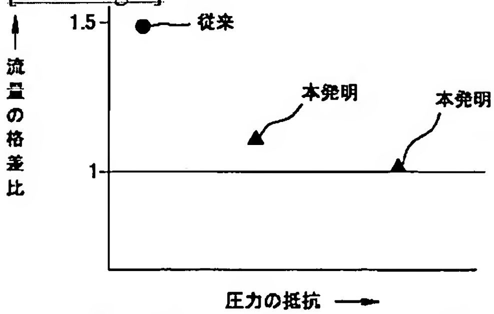
[Drawing 2]



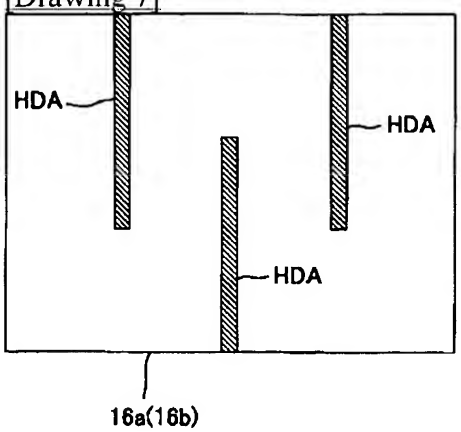
[Drawing 4]



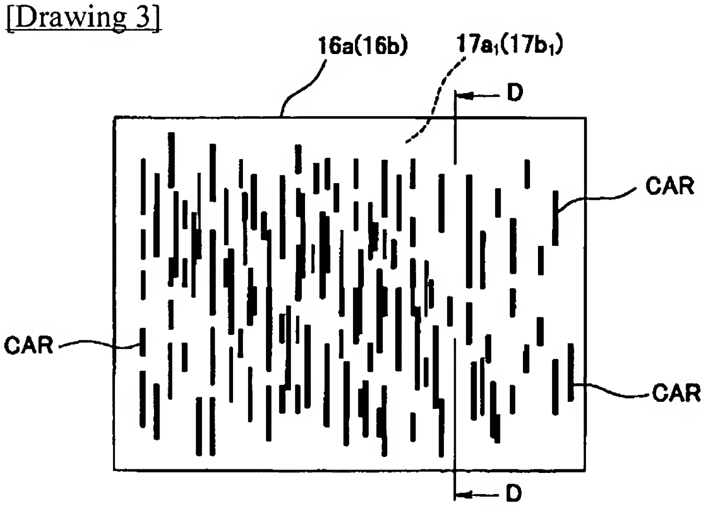
[Drawing 5]



[Drawing 7]



[Drawing 3]



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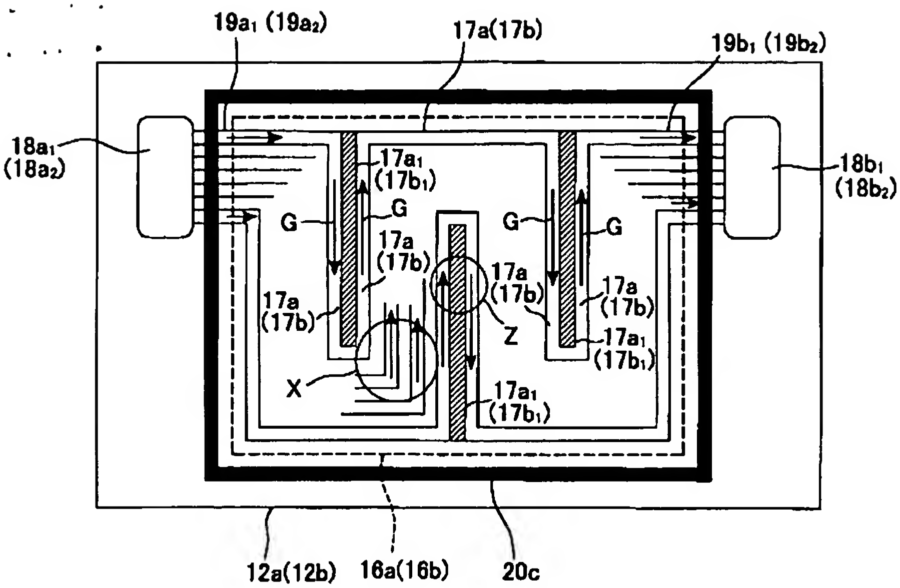
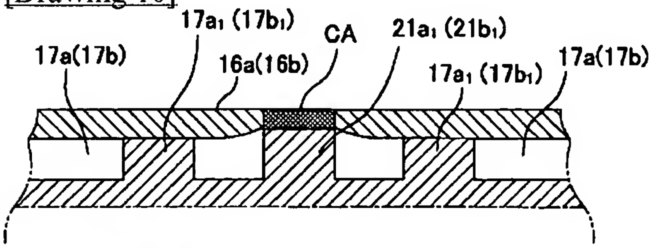
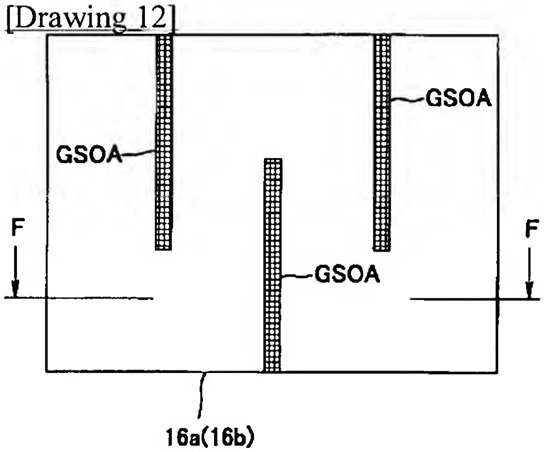


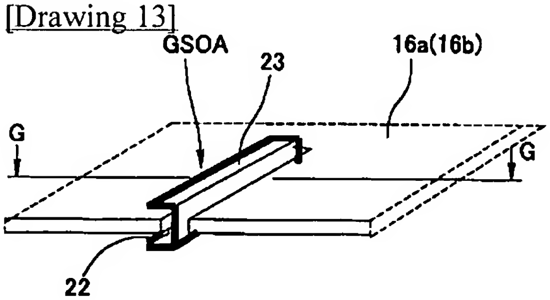
[Drawing 10]



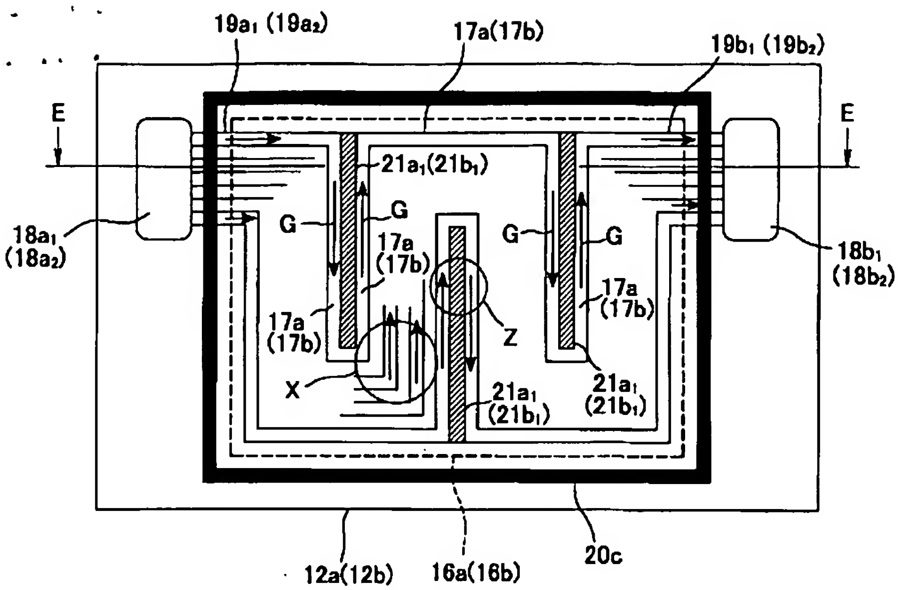
[Drawing 12]



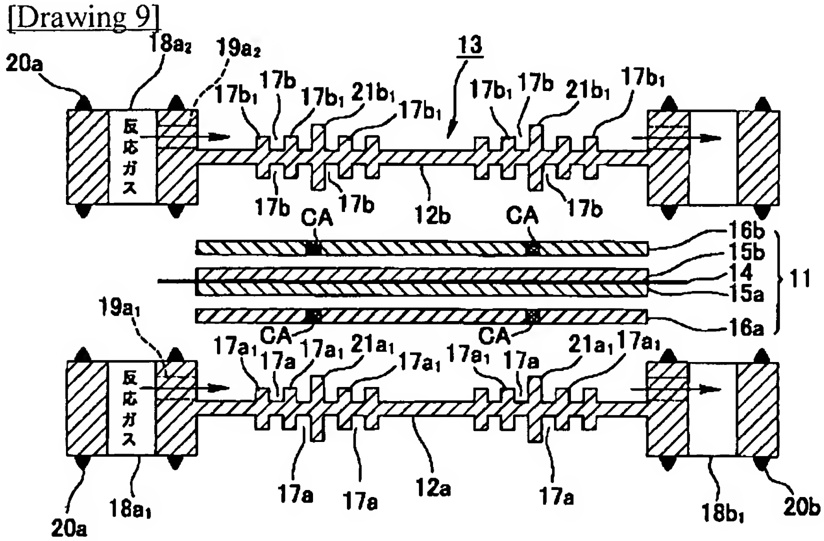
[Drawing 13]



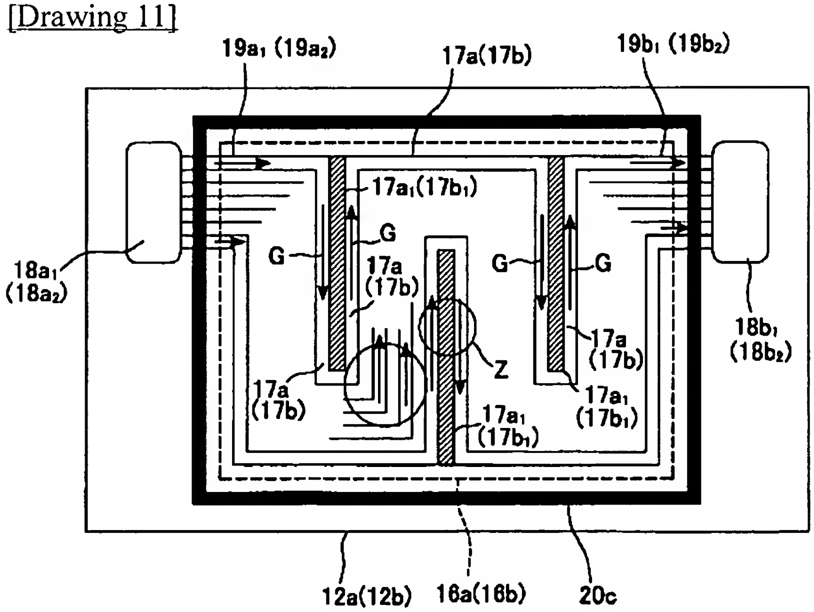
[Drawing 8]



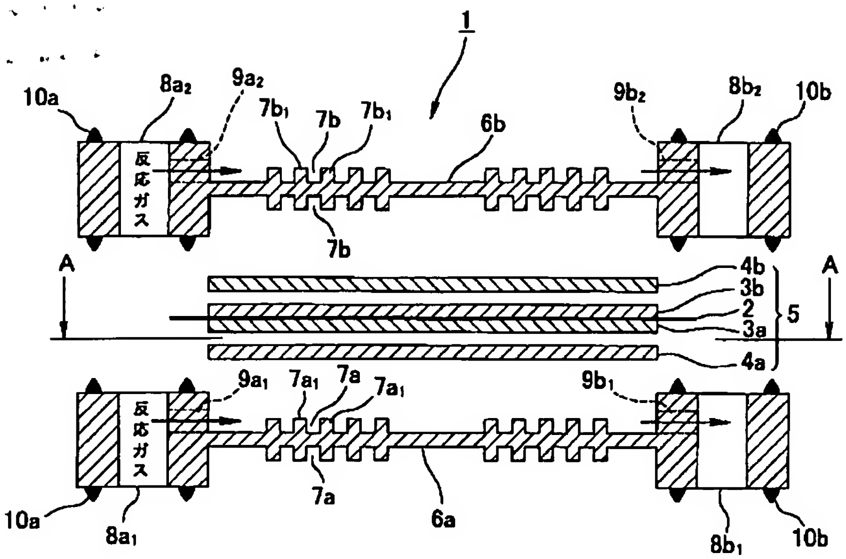
[Drawing 9]



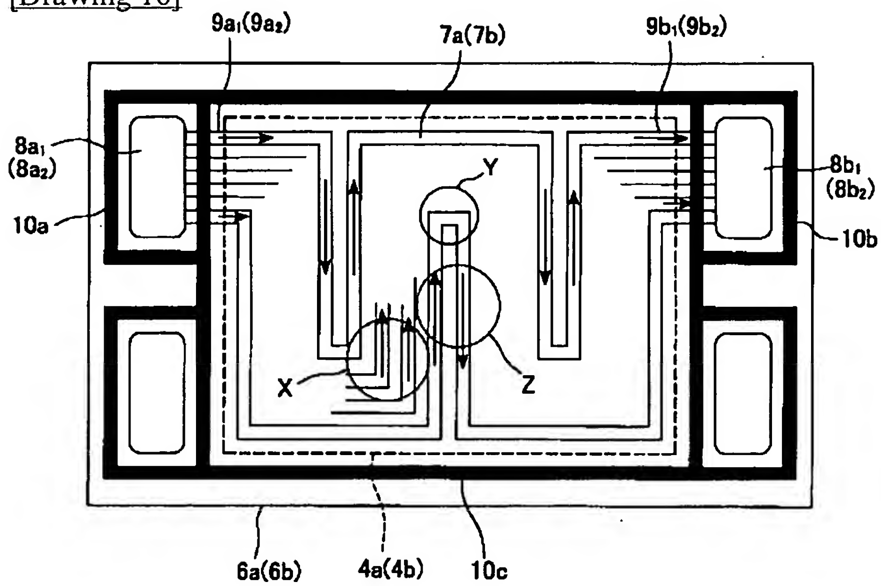
[Drawing 11]



[Drawing 15]



[Drawing 16]



[Translation done.]